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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	26

Application Number	10/625,838
Filing Date	July 22, 2003
First Named Inventor	Volker Krueger et al.
Art Unit	3672
Examiner Name	Frank Tsay
Attorney Docket Number	564-09225-US-C3

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s) **Replacement**
- ☐ Licensing-related Papers
- ☑ Petition to Withdraw Holding of Abandonment
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):
  1. Return Postcard
  2. Exhibit

Remarks

The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 02-0429 (564-09225-US-C3).

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Madan, Mossman & Sriram, P.C.		
Signature	Chandran D Kumar		
Printed name	Chandran D. Kumar		
Date	September 9, 2005	Reg. No.	48,679

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage by Express Mail No. EV 701442525 addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Margaret A. Pruitt	Date	September 9, 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	**Volker Krueger et al.** §	
	§	Group Art Unit: **3672**
SERIAL NO.:	**10/625,838** §	
	§	Examiner: **Frank Tsay**
FILED:	**July 22, 2003** §	
	§	Atty. Docket: **564-09225-US-C3**
TITLE:	**Drilling Assembly With Steering Device For Coiled-Tubing Operations** §	
	§	Confirmation No. **8973**

PETITION TO WITHDRAW HOLDING OF ABANDONMENT UNDER 37 CFR 1.181(a)

Mail Stop: Issue Fee
Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sirs:

Applicants received a Notice of Abandonment mailed August 18, 2005 stating abandonment of the captioned application in view of Applicant's failure to timely file a proper reply to the Office letter mailed on June 1, 2005. This Petition is being filed within two months of the mailing date of the Notice of Abandonment. Applicants respectfully submit that the Notice of Abandonment is inappropriate as a response to the June 1, 2005 Office letter was timely filed and mailed to the Mail Stop Issue Fee by Express Mail on July 1, 2005.

Attached are copies of the Response Notice of Drawing Inconsistency With Specification and Rule 312 Amendment as timely submitted on July 1, 2005, along with a copy of the annotated and replacement drawings as required. Also attached is a copy of Applicants' return postcard showing a date stamp by the USPTO (OIPE) as July 1, 2005 and a copy of the Express Mail Label as stamped by the U.S. Postal Service on July 1, 2005. The undersigned notes the typographical error in the date of the Express Mail certificate attached to the Response showing a June 1, 2005 mail date and draws the attention of the Office to the stamped Express Mail Label and return postcard both of which confirm the July 1, 2005 correct mail date.

Applicants respectfully request that, with the submission of the attached documents as sufficient evidence, the Petition be granted dismissing the Notice of Abandonment as untimely under 35 CFR 1.181(f).

Applicants believe that no fees are due with this Petition but should the Office deem otherwise, the Commissioner is authorized to charge any fees or credit any overpayment to Deposit Account No. **02-0429 (564-09225-USC3)**.

Respectfully submitted,

Date: September 9, 2005

Chandran D. Kumar
Registration No. 48,679
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Houston, Texas 77057
Telephone: 713/266-1130
Facsimile: 713/266-8510

CERTIFICATE OF MAILING UNDER 37 CFR 1.10

I hereby certify that this correspondence, and any referred to as being attached or enclosed, is being deposited with the United States Postal Service as "Express Mail, Post Office to Addressee," Express Mail No. **EV 701442525** in an envelope addressed to: Assistant Commissioner for Patents, Mail Stop: Issue Fee, P.O. Box 1450, Alexandria, Virginia 22313-1450 on this 9th day of September, 2005

Margaret A. Pruitt

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Volker Krueger et al.	§	Art Unit: 3672
Serial No: 10/625,838	§	
Filed: July 22, 2003	§	Frank Tsay
Title: "Drilling Assembly with a Steering Device for Coiled-Tubing Operations"	§	Docket No: 564-9225-US-C3

MS Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE NOTICE OF DRAWING INCONSISTENCY WITH SPECIFICATION AND RULE 312 AMENDMENT

This is in response to the Response Notice of Drawing Inconsistency, dated June 1, 2005 for the above-identified patent application.

AMENDMENTS TO THE DRAWINGS

Please amend **Figure 1b** as shown in red ink in the accompanying Drawing. Please add new **Figure 1d**.

AMENDMENTS TO THE SPECIFICATION

The amendments to the specification are provided below:

Replace the paragraph beginning on page 1, line 1 with the following:

This application ~~takes priority from~~ Claims the benefit of earlier filed provisional United States Application Serial No. 60/036,572, filed on January 29, 1997. This application is also a continuation of co-pending application Serial No. 09/015, 848, filed on January 29, 1998, now abandoned and United States Patent Application Serial No. 10/100,671 filed on March 18, 2002.

Add the following new paragraph on page 6, line 10:

Figure 1d is a schematic view cross-sectional side view of an alternate embodiment of a power unit for a pump.

Replace the paragraph beginning on page 6, line 20 with the following:

Figure 4 is a schematic view of a configuration of the steering members disposed around a non-rotating housing for use in the steering devices of **Figures** [[1-4]] 1-3.

Replace the paragraph beginning on page 7, line 1 with the following:

Figure 5 is a schematic view of an alternative configuration of the steering members disposed around a non-rotating housing for use in the steering devices of **Figures** [[1-4]] 1-3.

Replace the paragraph beginning on page 8, line 16 with the following:

The bearing assembly **20** contains within its housing **22** suitable radial bearings **56a** that provide lateral or radial support to the drive shaft **28** and the drill bit ~~12~~ **50**, and suitable thrust bearings **56b** to provide axial (longitudinal or along wellbore) support to the drill bit ~~12~~ **50**. The drive shaft **28** is coupled to the shaft **18** by a suitable coupling **44**. The shaft **18** is a flexible shaft to account for the eccentric rotation of the rotor **14**. Any suitable coupling arrangement may be utilized to transfer rotational power from the rotor **14** to the drive shaft **28**. During the drilling of the wellbores, the drilling fluid **52** leaving the power section [[14]] 12 enters the through passage **24** of the drive shaft **28** at ports or openings **46** and discharges at the drill bit bottom **53**. Various types of bearing assemblies are known in the art and are

thus not described in greater detail here.

Replace the paragraph beginning on page 9, line 21 with the following:

The operation of each steering rib **32** is independently controlled by a separate piston pump **40**. For short radius drilling assemblies, each such pump **40** is preferably an axial piston pump **40** disposed in the bearing assembly housing **22**. In one embodiment, the piston pumps **40** are hydraulically operated by the drill shaft **28** utilizing the drilling fluid **52** flowing through the bearing assembly **20**. A control valve **33** is disposed between each piston pump **40** and its associated steering rib **32** to control the flow of the hydraulic fluid from such piston pump **40** to its associated steering rib **32**. Each control valve **33** is controlled by an associated valve actuator **37**, which may be a solenoid, magnetostrictive device, electric motor, piezoelectric device or any other suitable device. To supply the hydraulic power or pressure to a particular steering rib **32**, the valve actuator **37** is activated to provide hydraulic power to the rib **32**. If the valve actuator **37** is deactivated, the check valve is blocked, and the piston pump **40** cannot create pressure in the rib **32**. During drilling, all piston pumps **40** are operated continuously by the drive shaft **28**. In one method, the duty cycle of the valve actuator **37** is controlled by processor or control circuit **80** disposed at a suitable place in the drilling assembly **100**. **Figure 1A** shows the control circuit **80** placed in the rotor **14** to conserve space. The control circuit may be placed at any other location, including at a location above the power section ~~40~~ 12. Instead of using the hydraulic power to operate the pumps **40**, each pump **40** may be operated by electric motors (not shown) suitably disposed in the bearing assembly **20**. A separate electric motor may be operably connected to each pump. Each of the electric motors can be configured to control a linear motion of pump to move the rib between a normal or collapsed position **32a** and an extended position **32b**.

Replace the paragraph beginning on page 11, line 21 with the following:

The use of axial piston pumps **40** enables disposing such pumps **40** in the bearing assembly and relatively close to the ribs **30**. This configuration can reduce the overall length of the drilling assembly. Placing the ribs **32** in the housing **22** of the bearing assembly **20** aids in drilling relatively shorter radius boreholes. The above-described arrangement of the

steering device **30** and the ability to independently control the pressure on each rib **32** enables steering the drill bit **12** in any direction and further enables drilling the borehole with a controlled build-out rate (deviation angle). Preferably a separate sensor **39** is provided in the bearing assembly **20** to determine the amount of force applied by each rib **32** to the borehole interior **38**. The sensor ~~33~~ 39 may be a pressure sensor, a position measuring sensor or a displacement sensor. The processor **80** processes the signals from the sensor **39** and in response thereto and stored information or models controls the operation of each rib **32** and thus precisely controls the drilling direction.

Replace the paragraph beginning on page 13, line 3 with the following:

Electric conductors **65** are run from an upper end **11** of drilling motor **10** to the bearing assembly **20** for providing required electric power to the valve actuators ~~33~~ 39 and other devices and sensors in the drilling motor **10** and to ~~transit~~ transmit data and signals between the drilling motor **10** and other devices in the system. The rotor **14** and the shaft **28** may be hollow to run conductors **65** therethrough. Appropriate feed-through connectors or couplings, such as coupling **63**, are utilized, where necessary, to run the electric conductors **65** though the drilling motor **10**. An electric slip ring device **70** in the bearing assembly **20** and a swivel (not shown) at the top of the power section **12** is preferably utilized to pass the conductors **65** to the non-rotating parts in the bearing assembly **20**. Electric swivel and slip rings may be replaced by an inductive transmission device. The devices and sensors such as pressure sensors, temperature sensors, sensors to provide axial and radial displacement of the drill shaft **28** are preferably included in the drilling motor **10** to provide data about selected parameters during drilling of the boreholes.

Replace the paragraph beginning on page 13, line 19 with the following:

Figure 2 is a schematic view of an alternative embodiment of a drilling assembly **100** with steering members **30** in the bearing assembly **20** of the mud motor **10** and the power and control devices **90** for operating the steering members **30** disposed above the power section **12** of the mud motor **10**. In this configuration the rotor **14** is coupled to the drill shaft **28** by a suitable coupling or flexible shaft **19**. A common housing **92** with or without connection joints **93** may be used to house the stator **16**, coupling **19** and the bearing

assembly **20**. A separate fluid line **91** is run from a source of hydraulic power in section **90** to each of the individual force application members **30** through the housing **92**. The section **90** contains the pumps and the control valves and the required control circuits to independently control the operation of each of the ribs **30**. This configuration is simpler than the configuration that contains the power and/or control devices in the mud motor **10**, more reliable as it does not require using mechanical and electrical connections inside the bearing housing **22**. It also enables building reduced overall length mud motors **10** compared to the configuration shown in **Figure 1**. The configuration of **Figure 2** allows drilling of the wellbores with a higher build up rate compared due the proximity of the ribs **30** near the drill bit **50** and the shorter length of the drilling motor **10**. A stabilizer **83** is provided at a suitable location uphole of the ribs **30** to provide lateral stability to the drilling assembly **100**. Alternatively, a second set of ribs **30** may be incorporated into the drilling assembly as described below.

Replace the paragraph beginning on page 14, line 20 with the following:

Figure 3 is a schematic view of drilling assembly configuration wherein the ribs **30** are placed above the mud motor **10** and the power unit and the control devices to control the operation of the ribs is disposed in a suitable section above the mud motor **10**. A hydraulic line **93** provides the fluid to the ribs **30**. The operation of the steering devices shown in **Figures 2** and **Figure 3** are similar to the operation of the embodiment of **Figures 1A-1C**. In yet another configuration, the ribs **30** may be placed in the bearing assembly **20** as shown in **Figure ~~3~~ 2** and also above the motor **10** as shown in **Figure [[4]] 3**. In such a configuration, a separate line is run for each of the ribs. A common control circuit and a common hydraulic power unit may be used for all the ribs with each rib having a separate associated control valve. This configuration allows ~~to~~ control of the drilling direction at multiple locations on the drilling assembly.

Replace the paragraph beginning on page 15, line 12 with the following:

Figure 4 is a schematic view of a configuration showing three force application members **32a-32c** disposed around the non-rotating housing **22** of the bearing assembly **20** of **Figures [[1-4]] 1-3**. The configuration of **Figure 4** shows three force application members

32a-32c placed spaced apart around the periphery of the bearing assembly housing **22**. The force application members **32a-32c** are identical and thus the configuration and operation thereof is described with respect to only the member **32a**. The force application member **32a** includes a rib member **102a** that is radially movable as shown by the arrows ~~**108a**~~ **110a**. A hydraulically-operated piston **104a** in a chamber **106a** acts on the rib member **102a** to moves the rib member **102a** outward to cause it to apply force to the wellbore. The fluid is supplied to the chamber **106a** from its associated power source via a port **108a**. As described earlier, each force application member is independently operated to control the amount of the force exerted by such member to the wellbore inside, which allows precisely controlling the drilling direction of the wellbore. The force application members **32b** and **32c** respectively include pistons **104b** and **104c**, chambers **106b** and **106c** and inlet ports **108b** and **108c** and they move in the directions shown by the arrows **110b** and **110c**. **Figure 5** is a schematic view of an alternative configuration of the steering members. This configuration differs from the configuration of **Figure 4** in that it does not have the rib members. The pistons **112a-112c** directly apply the force on the wellbore walls the pistons are extended outward.

Replace the paragraph beginning on page 14, line 20 with the following:

Figure 3 is a schematic view of drilling assembly configuration wherein the ribs **30** are placed above the mud motor **10** and the power unit and the control devices to control the operation of the ribs are disposed in a suitable section above the mud motor **10**. A hydraulic line **93** provides the fluid to the ribs **30**. The operation of the steering devices shown in **Figures 2** and **Figure 3** are similar to the operation of the embodiment of **Figures 1A-1C**. In yet another configuration, the ribs **30** may be placed in the bearing assembly **20** as shown in **Figure** [3] 2 and also above the motor **10** as shown in **Figure** [4] 3. In such a configuration, a separate line is run for each of the ribs. A common control circuit and a common hydraulic power unit may be used for all the ribs with each rib having a separate associated control valve. This configuration allows [to] control of the drilling direction at multiple locations on the drilling assembly.

Replace the paragraph beginning on page 15, line 12 with the following:

Figure 4 is a schematic view of a configuration showing three force application members **32a-32c** disposed around the non-rotating housing **22** of the bearing assembly **20** of **Figures** [[1-4]] 1-3. The configuration of **Figure 4** shows three force application members **32a-32c** placed spaced apart around the periphery of the bearing assembly housing **22**. The force application members **32a-32c** are identical and thus the configuration and operation thereof is described with respect to only the member **32a**. The force application member **32a** includes a rib member **102a** that is radially movable as shown by the arrows **[108a]** 110a. A hydraulically-operated piston **104a** in a chamber **106a** acts on the rib member **102a** to moves the rib member **102a** outward to cause it to apply force to the wellbore. The fluid is supplied to the chamber **106a** from its associated power source via a port **108a**. As described earlier, each force application member is independently operated to control the amount of the force exerted by such member to the wellbore inside, which allows precisely controlling the drilling direction of the wellbore. The force application members **32b** and **32c** respectively include pistons **104b** and **104c**, chambers **106b** and **106c** and inlet ports **108b** and **108c** and they move in the directions shown by the arrows **110b** and **110c**. **Figure 5** is a schematic view of an alternative configuration of the steering members. This configuration

differs from the configuration of **Figure 4** in that it does not have the rib members. The pistons **112a-112c** directly apply the force on the wellbore walls the pistons are extended outward.

REMARKS AND CONCLUSION

Applicants request entry of the above-listed amendments in the pending application. The amendments to Figures and Written Specification are intended to address objections the Examiner raised in the allowed grant-parent application. These same amendments were entered in the parent application. Thus, it is the Applicant's intent to ensure that the original application and all related continuation patents have the same specification and drawings. No new matter has been entered. For convenience, reproduced below are Applicant's remarks previously made regarding the drawings amendments:

> The Examiner objected to the drawings for perceived failure to show reference numbers "18", "51" and "57". The feature described as "shaft **18**" on page 8 of the specification is shown and labeled with "18" in Figure 1A. The label "18" appears between the numbers "65" and "16" on the right-hand side of Figure 1A. With respect to reference number "51", Figure 1B has been amended to show this reference number. With respect to reference number "WOB 57", Figure 1B has been amended to show this reference number. A marked-up version of Figure 1B accompanies this Response. Applicants submit that the above explanation and amendment resolve the Examiner's stated objection to the Drawings.
>
> The Examiner objected that the drawings do not appear to show the "electric motor" referred to in cancelled Claims 3 and 13. Applicants observe that on page 10 of the specification, it is explained that the pump 40 may be operated by an electric motor suitably disposed in the bearing assembly 20. It is also explained that the electric motor is an alternative to the disclosed arrangement utilizing hydraulic power. Applicants submit that the technical description and the originally filed Claims adequately describe the electric motor and its function. Nevertheless, to address the Examiner's stated objection, Applicants have added a new Figure 1d that reproduces the arrangement disclosed in the original specification wherein the electric motor 41 is shown.

The Commissioner is hereby authorized to charge any fees deemed necessary for

this Response to Examiner's Amendment and Rule 312 Amendment to Deposit Account No. 02-0429 (564-9225-US-C3), maintained by Baker Hughes Incorporated.

Respectfully submitted,

Dated: July 1, 2005

Chandran D. Kumar
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Madan, Mossman & Sriram, P.C.
2603 Augusta Suite 700
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Gretchen King

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DOCKET NO.: 564-9725-US-C3
SERIAL NO./PAT NO.: 10/625,838
DATE MAILED: 9.01.05
DATE DUE: 9.01.05
APPLICANT: Volker Krueger et al.
TITLE: Drilling Assembly with a Steering Device for Coiled-Tubing Operations

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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	10/625,838
Filing Date	July 22, 2003
First Named Inventor	Volker Krueger
Art Unit	3672
Examiner Name	Frank Tsay
Total Number of Pages in This Submission: 21	Attorney Docket Number: 564-9225-US-C3

ENCLOSURES *(Check all that apply)*

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- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Madan, Mossman & Sriram, P.C.		
Signature	Chandran D. Kumar		
Printed name	Chandran D. Kumar		
Date	July 1, 2005	Reg. No.	48,679

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Signature	Gretchen King		
Typed or printed name	Gretchen King	Date	July 1, 2005

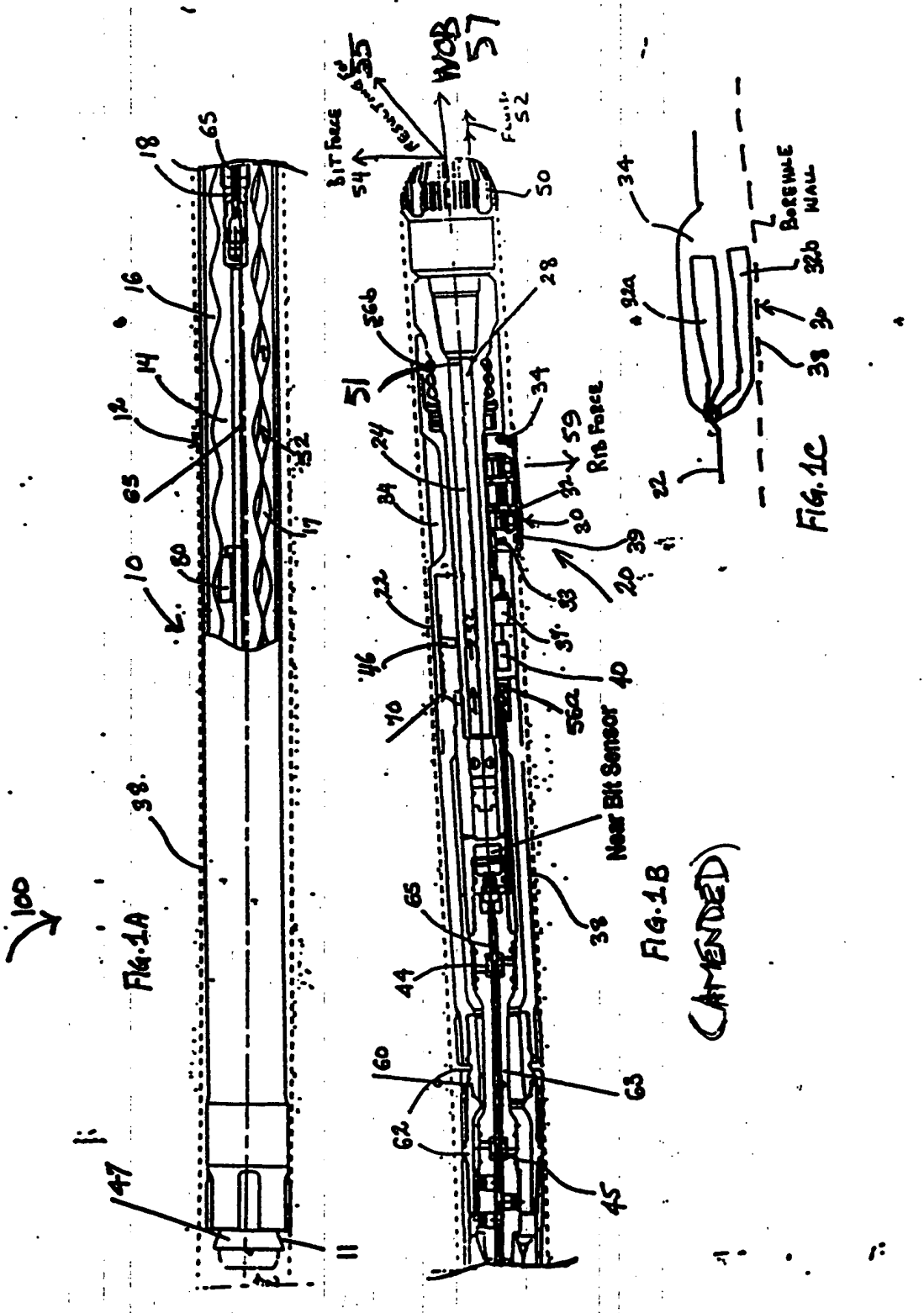

FIG. 1A

FIG. 1B (AMENDED)

FIG. 1C

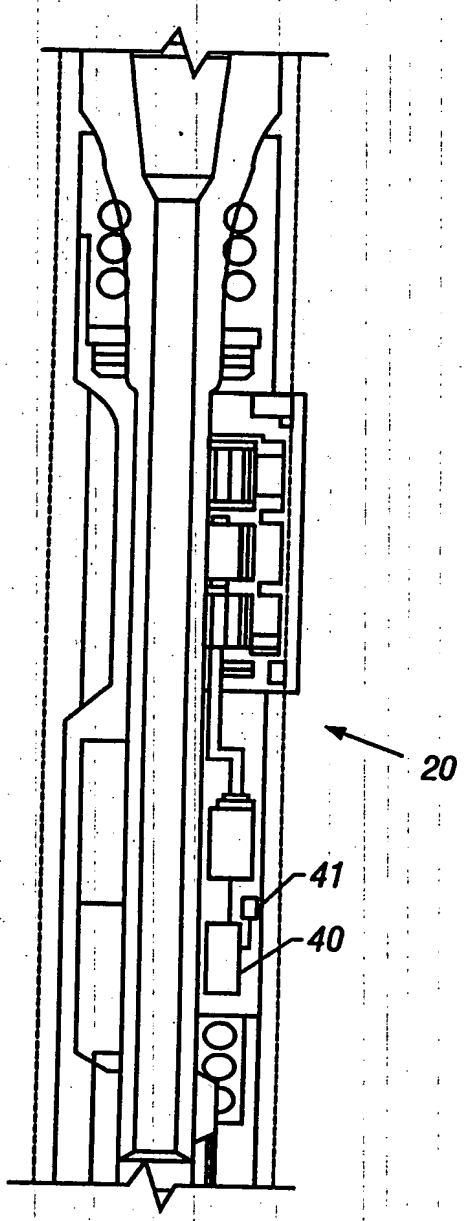

Figure 1D

(NEW)

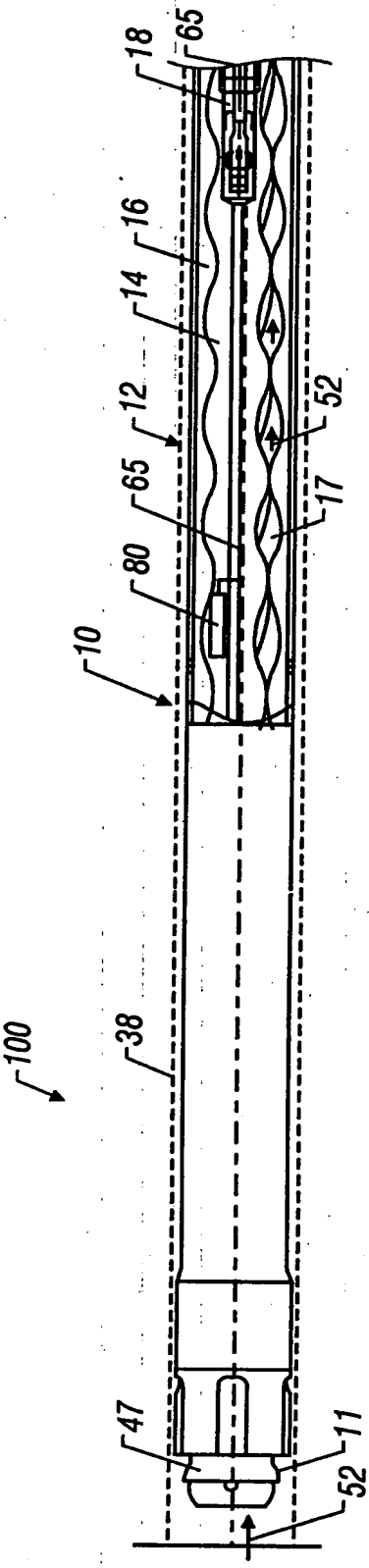

Figure 1A

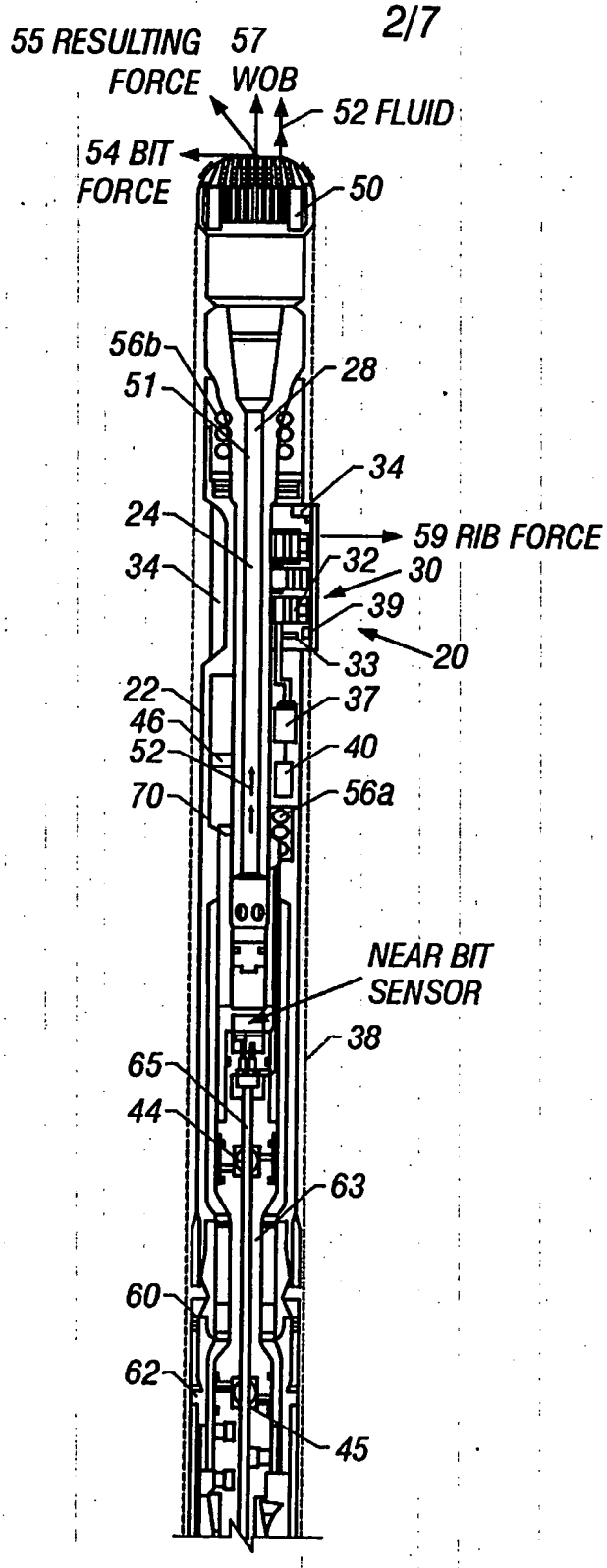

Figure 1B

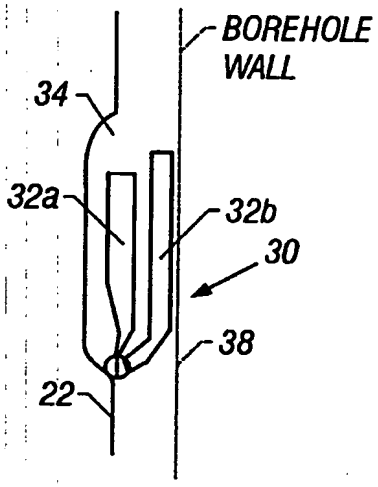

Figure 1C

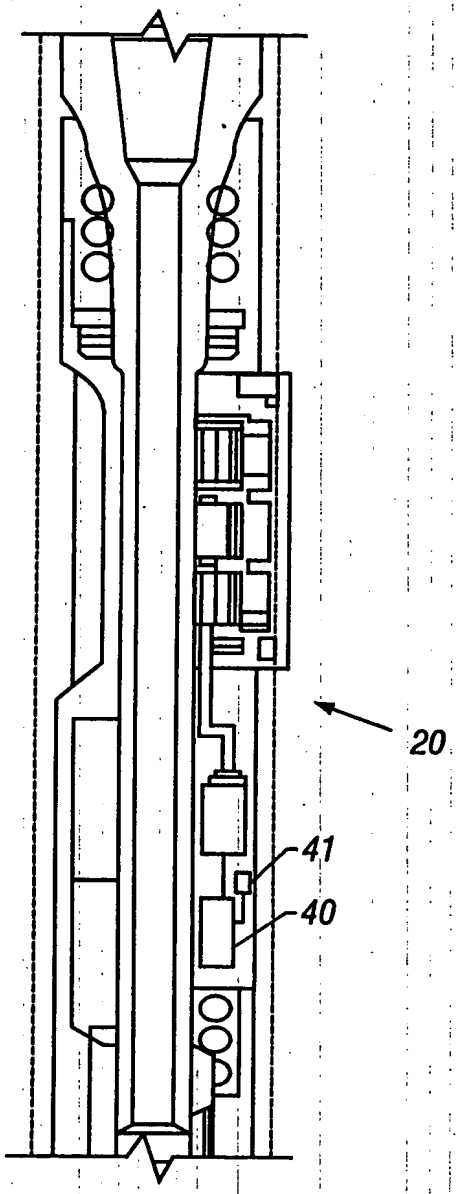

Figure 1D

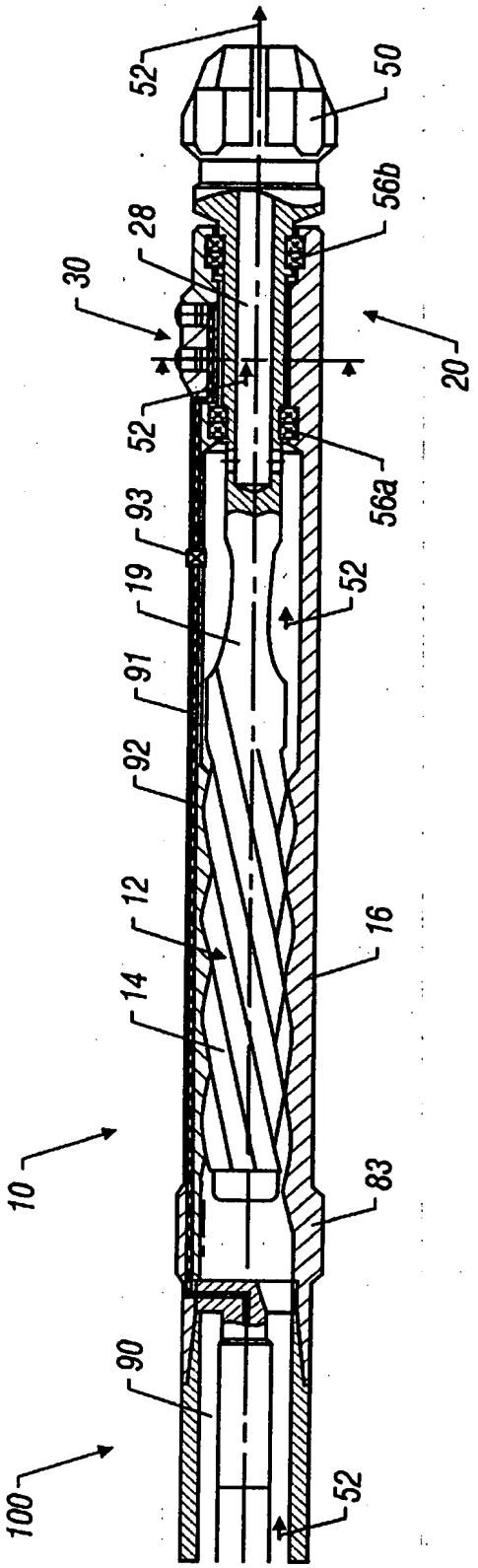

Figure 2

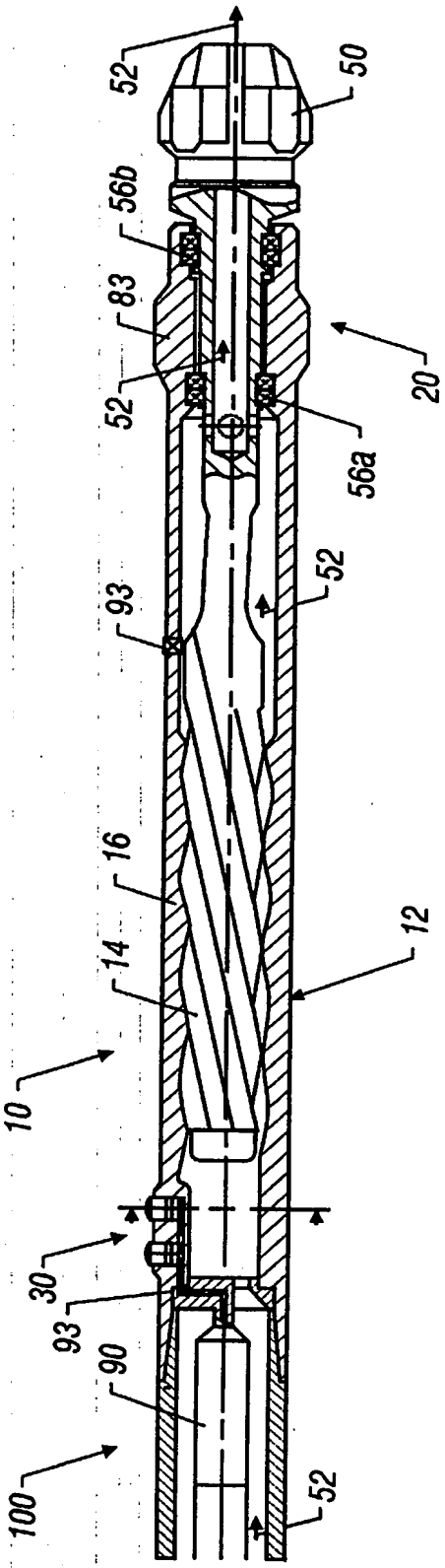

Figure 3

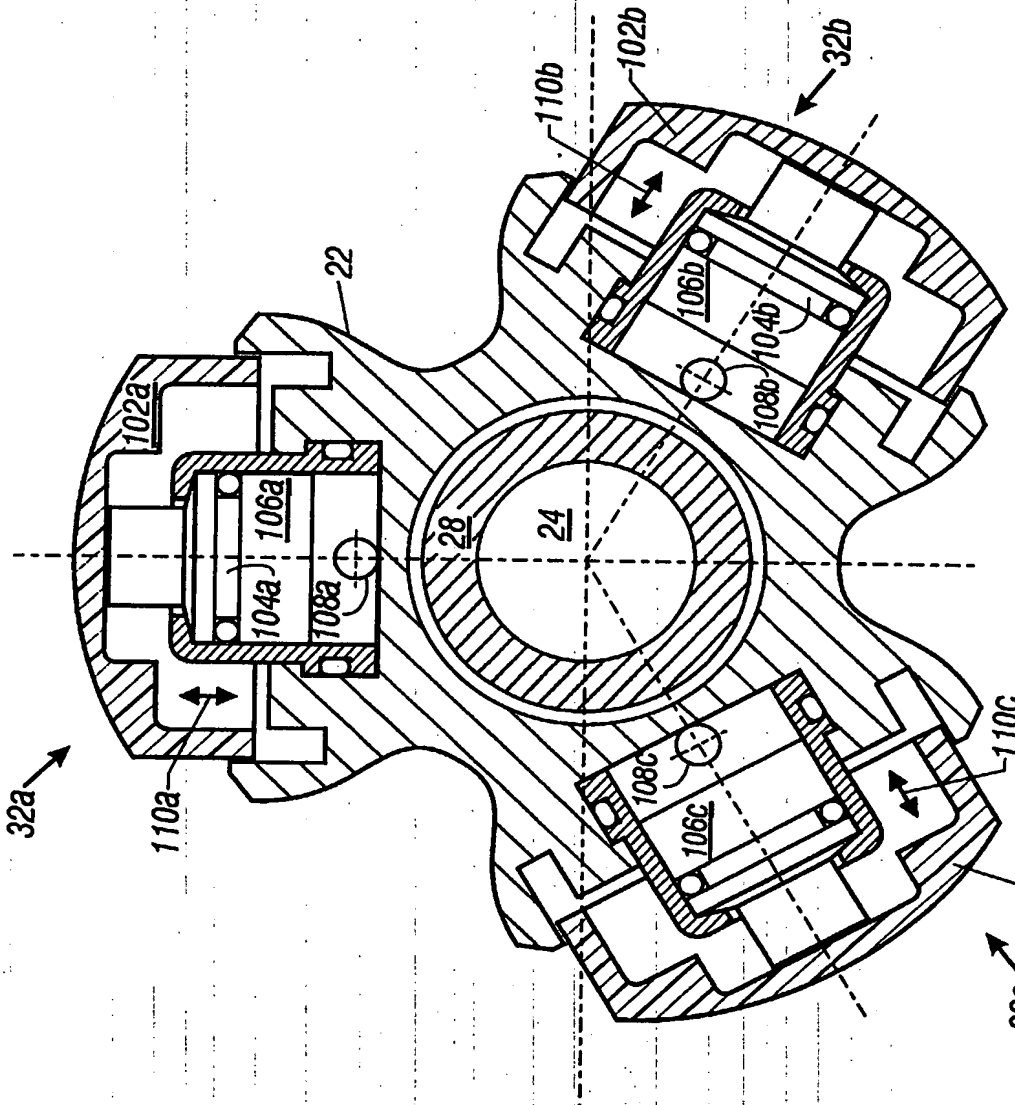

Figure 4

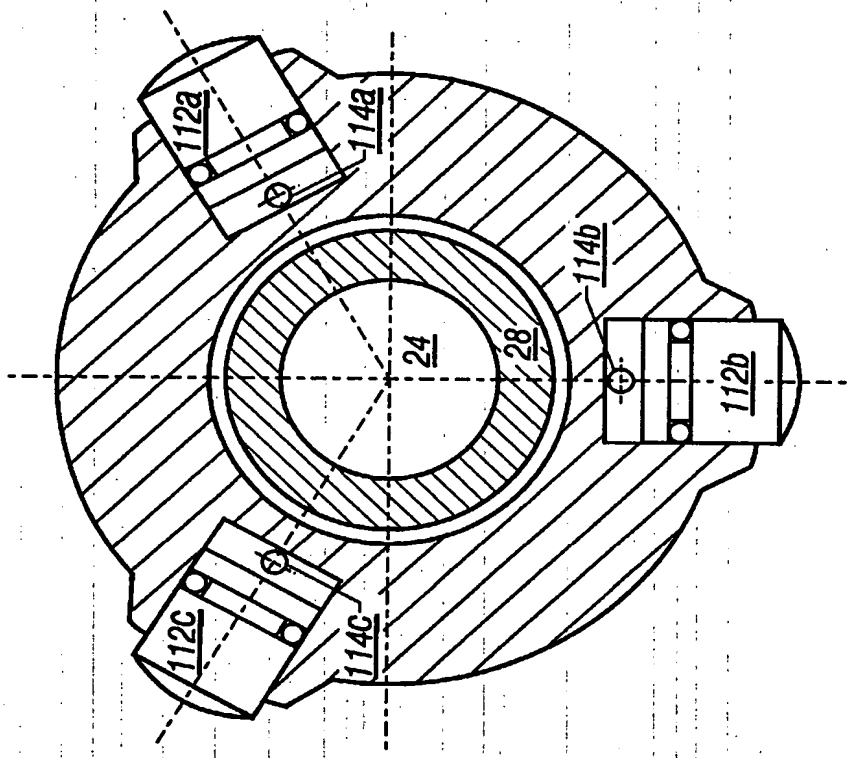

Figure 5

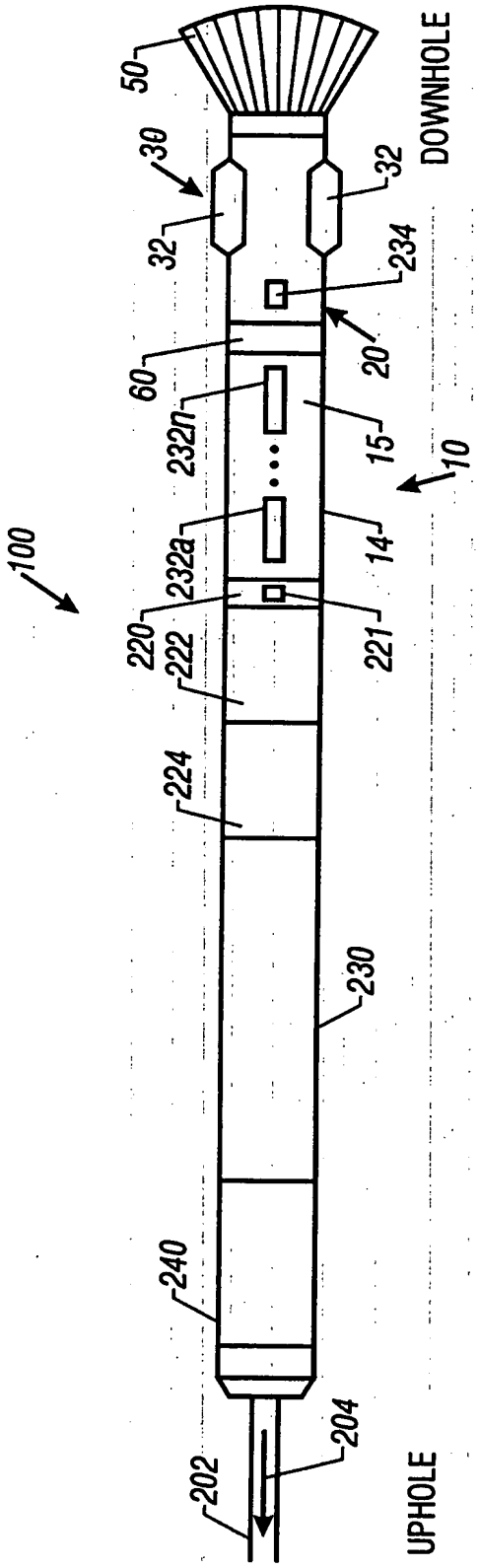

Figure 6